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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,623	09/27/2001	Charles D. Murphy		9721

30320	7590	03/25/2005		

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EXAMINER
DO, CHAT C

ART UNIT	PAPER NUMBER
2193	

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/963,623	MURPHY, CHARLES D.
	Examiner	Art Unit	
	Chat C. Do	2124	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>10 November 2004</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-32</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-32</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1. This communication is responsive to Amendment filed 11/10/2004.

2. Claims 1-32 are pending in this application. Claims 1 and 17 are independent claims. In Amendment, claims 1-32 are amended. This Office action is made final.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 17-32 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 17-32 clearly recite a method for computing one or more sums of products according to a mathematic algorithm. In order for such a claimed method, computer-related process, or a claimed non-specified apparatus implementing the underlined process to be statutory, the claims must include either a step or means that results in a physical transformation outside the computer or a limitation to a practical application. However, it is clear from the claims that the claims merely recite step or non-specific means for data computation and manipulation in performing a mathematical function. The input is a set of numbers and output is also a set of number. The claims fail to recite any step or means that results in a physical transformation outside the computer, that includes a limitation to a practical application, or that requires a specific computer to

implement the claimed process. Therefore, claims 17-32 are clearly directed to a non-

statutory subject matter.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   Claims 1-8, 10-24, and 26-32 are rejected under 35 U.S.C. 102(b) as being anticipated by

Richardson (U.S. 5,262,973).

Re claim 1, Richardson discloses in Figure 5 a machine used in computing one of

more sums of products (claim 1 pre-amble) wherein at least one of sums of products

includes the product of a first input and a first weight and the products of a second input

and a second weight, where first input differs from second input and where first weight

differs from second weight (abstract) comprising: a. a first number (e.g. 640 as X)

represented in a first finite-precision numeric format (col. 2 lines 25-30), and having a

first numeric value (e.g. any finite numbers except 0, -1, 1, NAN, -inf, and +inf); b. a

second number (e.g. 650 as Y) represented in a second finite-precision numeric format

(col. 2 lines 25-30) and having a second numeric value; c. first multiplier means (500) for

computing a first product equal to the product of first number and second number (e.g. Z

= X * Y), where; i. first multiplier means can compute the product of a first multiplier

input and a second multiplier input when the first multiplier input is any number from

first multiplier-desired restricted set and the second multiplier input is second number
(e.g. belong to the restricted set, no halt signal is generate which enable 500); ii. first
multiplier means cannot compute the product of a first multiplier input and a second
multiplier input when the first multiplier input is not a member of first multiplier-defined
restricted set, the second multiplier input is second number, the first multiplier input has
numeric value not equal to zero, and the second multiplier input has numeric value not
equal to zero (e.g. when x or y or x and y are 1, the halt signal is generate to bypass the
multiplication 500); iii. first multiplier-defined restricted set has more than one member
(e.g. 2, 3, 4..); and iv. first multiplier-defined restricted set does not include all the
members of a first unrestricted set (inherent for limited set of memory), first unrestricted
set including all numbers having first finite-precision numeric format and (e.g. 0, 1, -1);
v. where either 1. first multiplier input is first input and first multiplicand input is first
weight, or 2. first multiplier input is first weight and first multiplicand input is first input;
whereby first multiplier means is not a general multiplier able to compute the product of
second number and any member of first unrestricted set (abstract lines 6-13) when second
numeric value is not equal to zero.

Re claim 2, Richardson further discloses in Figure 5 first multiplier-defined
restricted set includes a first member having a numeric value equal to zero (e.g. 510 or
540).

Re claim 3, Richardson further discloses in Figure 5 first multiplier-defined
restricted set includes a first member having numeric value not equal to zero, not equal to
positive one, and not equal to negative one and a second member having numeric value

that is not equal to zero, not equal to positive one, and not equal to negative one (510 to

560).

Re claim 4, Richardson further discloses in Figure 5 first multiplier-defined

restricted set has exactly two members (e.g. 2 and 3) which are a first member and a

second member.

Re claim 5, Richardson further discloses in Figure 5 first member of first

multiplier-defined restricted set has a numeric value equal to zero (e.g. 510 or 540).

Re claim 6, Richardson further discloses in Figure 5 the numeric value of first

member of first multiplier-defined restricted set is equal to the negative of the numeric

value of second member (e.g. −1 and 1).

Re claim 7, Richardson further discloses in Figure 5 first member of first

multiplier-defined restricted set is a shifted version of the representation element values

of the second member (e.g. 1 shift right would be 0).

Re claim 8, Richardson further discloses in Figure 5 first multiplier-defined

restricted set has more than two members (e.g. 2, 3, 4...).

Re claim 10, Richardson further discloses in Figure 5 a third number represented

in a third finite-precision numeric format and having a third numeric value, b. a fourth

number represented in a fourth finite-precision numeric format and having a fourth

numeric value; and c. second multiplier means comprising a second multiplier input, a

second multiplicand input, a second product output, and where i. second multiplier means

can compute the product of a first multiplier input and a second multiplier input when the

first multiplier input is any number from second multiplier-defined restricted set and the

second multiplier input is fourth number second multiplier means cannot compute the

product of a first multiplier input and a second multiplier input when the first multiplier

input is not a member of second multiplier-defined restricted set, the second multiplier

input is fourth number, the first multiplier input has numeric value not equal to zero, and

the second multiplier input has numeric value not equal to zero iii. second multiplier-

defined restricted set has more than one member whereby first product and second

product may be computed with lower complexity than if general multiplier means were

used to compute each product (e.g. the third number and a fourth number are just another

set of operands with selective number(s) in the sets).

Re claim 11, Richardson further discloses in Figure 5 a second multiplier-defined

restricted set does not include all members of a second unrestricted set consisting of all

numbers having third finite-precision numeric format (e.g. two separate sets contain

separate members S1{odd} and S2{even}).

Re claim 12, Richardson further discloses in Figure 5 first multiplier-defined

restricted set and second multiplier-defined restricted set do not have any common

members (e.g. two separate sets contain separate members S1{odd} and S2{even}).

Re claim 13, it has the similar limitations cited in claim 1 for the second number

of the second multiplier-defined restricted set (e.g. Y). Thus, claim 13 is also rejected

under the same rationale as cited in the rejection of rejected claim 1.

Re claim 14, it has the similar limitations cited in claim 2 for the second number

of the second multiplier-defined restricted set (e.g. Y). Thus, claim 14 is also rejected

under the same rationale as cited in the rejection of rejected claim 2.

Re claim 15, it has the similar limitations cited in claim 3 for the second number of the second multiplier-defined restricted set (e.g. Y). Thus, claim 15 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 16, it has the similar limitations cited in claim 4 for the second number of the second multiplier-defined restricted set (e.g. Y). Thus, claim 16 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 17, it is a method claim of claim 1. Thus, claim 17 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 18, it is a method claim of claim 2. Thus, claim 18 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 19, it is a method claim of claim 3. Thus, claim 19 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 20, it is a method claim of claim 4. Thus, claim 20 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 21, it is a method claim of claim 5. Thus, claim 21 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 22, it is a method claim of claim 6. Thus, claim 22 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 23, it is a method claim of claim 7. Thus, claim 23 is also rejected under the same rationale as cited in the rejection of rejected claim 7.

Re claim 24, it is a method claim of claim 8. Thus, claim 24 is also rejected under the same rationale as cited in the rejection of rejected claim 8.

Re claim 26, it is a method claim of claim 10. Thus, claim 26 is also rejected

under the same rationale as cited in the rejection of rejected claim 10.

Re claim 27, it is a method claim of claim 11. Thus, claim 27 is also rejected

under the same rationale as cited in the rejection of rejected claim 11.

Re claim 28, it is a method claim of claim 12. Thus, claim 28 is also rejected

under the same rationale as cited in the rejection of rejected claim 12.

Re claim 29, it is a method claim of claim 13. Thus, claim 29 is also rejected

under the same rationale as cited in the rejection of rejected claim 13.

Re claim 30, it is a method claim of claim 14. Thus, claim 30 is also rejected

under the same rationale as cited in the rejection of rejected claim 14.

Re claim 31, it is a method claim of claim 15. Thus, claim 31 is also rejected

under the same rationale as cited in the rejection of rejected claim 15.

Re claim 32, it is a method claim of claim 16. Thus, claim 32 is also rejected

under the same rationale as cited in the rejection of rejected claim 16.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

8.   Claims 9 and 25 are rejected under 35 U.S.C. 103(a) as being obvious over Richardson

(U.S. 5,262,973) in view of Deutsch et al. (U.S. 4,031,377).

Re claim 9, Richardson further discloses in Figure 5 first multiplier-defined restricted set has a first member and a second member with the following properties: a. first member is not an integer multiple of second member (e.g. $X = 3$) b. second member is not an integer multiple of first member ($Y = 5$). Richardson does not disclose that the multiplication is related by at least one shift and one addition. However, Deutsch et al. disclose a multiplication that are related at least one shift and one addition in Figure 1. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a multiplication using at least one shift and one addition as seen in Deutsch et al.'s invention into Richardson's invention because it would enable to increase the system performance and simplify the hardware circuit (col. 2 lines 25-34).

Re claim 25, it is a method claim of claim 9. Thus, claim 25 is also rejected under the same rationale as cited in the rejection of rejected claim 9.

Response to Amendment

9.   The amendment filed 11/10/2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

Re claim 1, limitations "first multiplicity of control signals... second numeric value" in page 1 lines 15-28 and page 2 lines 1-6 are considered the new matter, in particularly the state and the control signals.

Claims 10 and 13, they also have the new matters as above in claim 1.

In specification, added paragraphs in pages 2-3 in Amendment A filed 11/10/2004 introduce new matters, in particularly the state and the control signal.

Figure 1, it introduces new matter with the control signal label as 18.

Applicant is required to cancel the new matter or specifically and clearly pointed out exact page(s) and line(s) in the specification to support the new matter above in the reply to this Office Action.

Response to Arguments

10.   Applicant's arguments filed 11/10/2004 have been fully considered but they are not persuasive.

a.   The applicant argued in pages 8-12 for claims that the external control signals do not define a multiplier's ability or inability to compute a given product in the present invention.

The examiner respectfully submits that the external control signal cited in the claims of the present invention is not considered because it introduces new matter as clearly cited under "Response to Amendment" section above.

Conclusion

11.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chat C. Do whose telephone number is (571) 272-3721. The

examiner can normally be reached on M => F from 7:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chaki Kakali can be reached on (571) 272-3719. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2124

March 9, 2005

KAKALI CHAKI
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